was the first to define with perfect clearness, and to show the true bearing of in relation to the connected ideas of electromotive force and strength of current.

At the meeting on January 31, resolutions, moved by the President of the Royal Society and by Sir Frederick Abel, K.C.B., were adopted, expressing the concurrence of those present with the proposal to erect a statue to Ohm, and appointing a Committee to make the scheme known in this country and to collect subscriptions. Dr. Hugo Müller, F.R.S. (who, when a student at the University of Munich, was a pupil of Ohm's), was requested to act as Treasurer of the fund to be collected, and Profs. G. Carey Foster, F.R.S., and John Perry, F.R.S., were appointed Secretaries.

The following memoranda, taken from Lamont's *Denkrede* to the Munich Academy, 1855, may not be without interest at the present time:—Ohm was born in Erlangen, where his family had been settled for several generations. His father, who followed the hereditary trade of lock-smith, was a man of active intellect, and gained a very considerable acquaintance with mathematics and physics. It was in great measure owing to his example and encouragement that his two sons, George Simon and Martin (who afterwards attained great distinction as Professor of Mathematics in the University of Berlin), developed a love for similar studies. In 1805, G. S. Ohm became a student of the University of Erlangen, whither he returned in 1811, after some years spent as a private tutor in Switzerland, and then took his doctor's degree and established himself as *Privatdocent*. For a short time he was a teacher in the *Realschule* at Bamberg, and in 1817 obtained a more important post as teacher of mathematics in the Jesuits' Gymnasium at Cologne. It was while he held this appointment that his ideas as to the laws of the galvanic circuit took definite shape, and that his memorable book, "Die galvanische Kette mathematisch bearbeitet," was written. Soon after the publication of this book in 1827, Ohm presented himself at the Ministry of Education in Berlin, and there met with a reception so little appropriate to the whole-hearted and self-sacrificing devotion to science of which he was conscious, that he felt it impossible to remain any longer in the public service. He was thus driven to spend seven years in the prime of life in a state of deep mental dejection, and with very scanty means of subsistence. The end of this dismal period came in 1833, when he was appointed, by the Bavarian Government, Professor in the Polytechnic School at Nuremberg. The award of the Copley Medal, in 1841, already mentioned, cheered and encouraged him still further, and in grateful acknowledgment he dedicated to the Royal Society his "Molecular Physics." From this time he came to be recognized as one of the leading physicists of Germany, and "Ohm's law" soon found its way into every text-book of physics. In 1849, he was called to Munich as Curator of the Physical Cabinet, and in 1852 he became Professor of Experimental Physics in the University. On July 7, 1854, he died suddenly from apoplexy. For a great part of his life he had a hard fight with outward circumstances; but he seems to have remained throughout singularly simple-minded and unassuming, and at the same time thoroughly honest and conscientious in his work. G. C. F.

THE ROYAL SOCIETY OF EDINBURGH.[1]

At the commencement of the session 1883-84, the Royal Society of Edinburgh entered upon the second century of its existence. Since its foundation it has had among its members men whose fame is national and often world-wide—Joseph Black, Henry Dundas, James Hutton, John Playfair, Adam Smith, Dugald Stewart, Adam Fergusson, James Gregory, Henry Mackenzie, John Leslie, William Wallace, Walter Scott, Maclaurin, Brewster, Forbes, and more recently Clerk Maxwell; and at present it has members whose names will rank as high as these. In the year 1886 the membership of the Society was 507, and was rapidly increasing. The number of papers communicated to it in the period 1883-87 was 317. We shall therefore select for special notice a few of these, which may be taken as typical of the work done by the Society; and it will be seen that its work, if large in quantity, is also high in quality. We agree with the opinion expressed to the Society by the Chairman in his opening address in December 1886, that, "if we include the extra volumes on the Ben Nevis observations, and on the botany of Socotra, . . . the Proceedings and Transactions of the Society during the past three years probably surpass in bulk and importance those of any other Society in the United Kingdom for the same period."

In the department of mathematics, these volumes include valuable contributions to the science of situation, or of those space-relations which are independent of *measure* though not necessarily of *number*, from the Rev. T. P. Kirkman and Prof. Tait. The former writer contributes papers "On the Enumeration, Description, and Construction of Knots of fewer than Ten Crossings," and "On the 364 Unifilar Knots of Ten Crossings;" a note "On the Twists of Listing and Tait," and "Examples upon the reading of a Circle or Circles of a Knot." Prof. Tait gives a "Census of 8-fold and 9-fold Knottiness," and a "Census of 10-fold Knottiness," with a special treatment of amphicheirals. There is also a paper, "Ueber algebraische Knoten," by Prof. Fr. Meyer, of Tübingen.

Dr. Thomas Muir treats of subjects connected with the theory of continued fractions and with the theory of determinants. Dr. Muir constantly aims at the attainment of simplicity through great generalization. An example of this is given in his paper "On the Researches of M. de Jonquières on Periodic Continued Fractions." He points out that many of the theorems given by M. de Jonquières are not new, and that the earlier ones are all special cases of a more general theorem previously published by Dr. Muir himself. He then proceeds to use this general theorem for the purpose of giving unity to M. de Jonquière's work.

Among other papers we note, "The Expansion of Functions in terms of Linear, Cylindric, Spherical, and Allied Functions," by Mr. P. Alexander; a quaternion investigation by Dr. G. Plarr of "The curve on one of the co-ordinate planes which forms the outer limit of the position of the point of contact of an ellipsoid which always touches the three planes of reference;" and a note "On the Hessian," by Prof. Chrystal. M. Hermite contributes a paper "Sur la Réduction des Intégrales Hyperelliptiques," and Prof. L. Cremona gives an "Esempio del metodo di dedurre una superficie da una figura piana."

In a remarkable paper "On the Law of Inertia; the Principle of Chronometry; and the Principle of Absolute Clinural Rest, and of Absolute Rotation," Prof. James Thomson treats of questions on the border-ground between pure mathematics and physics. He discusses "such motions of points in unmarked space, as can have a reference frame relatively to which these motions are rectilinear and are changeless in mutual rate." The problem of finding a reference frame for a known set of such points is worked out in another paper by the same author by a method of mechanical adaptations, and Prof. Tait has given a quaternion solution of it. Prof. Thomson's law of inertia is the equivalent of Newton's first and second laws of motion. The paper is one which merits the perusal of all students of dynamics, and it may be specially recommended for study to certain classes of metaphysicians.

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[1] Proceedings, Sessions 1883-87. Transactions, Vol. xxx. Part 4; Vol. xxxii. Parts 2, 3, 4; Vol. xxxiii. Parts 1, 2.

The fact that, in the kinetic theory of gases, Boltzmann's extension of Clerk Maxwell's theorem regarding the distribution of energy in a system of colliding spheres has led to results which are inconsistent with either the observed value of the ratio of the specific heats of a gas, or the complexity of the radiation spectra of gases, has induced Prof. Tait to investigate the question afresh from the very commencement. His results are contained in papers "On the Foundations of the Kinetic Theory of Gases," published in the Transactions. His great aim is the simplification of the mathematical treatment of the subject, and he has "purposely gone into very minute detail in order that no step taken, however slight, might have the chance of escaping criticism, or might have the appearance of an attempt to gloss over a difficulty." Abstracts of the papers have appeared in the *Philosophical Magazine*. The subjects treated in the first two papers are as follows: one set of equal spheres; mean free path among equal spheres; number of collisions per particle per second; Clerk Maxwell's theorem; rate of equalization of average energy per particle in two mixed systems; mean path in a mixture of two systems; pressure in a system of colliding particles; effect of external potential; pressure in a mixture of two sets of spheres; viscosity; thermal conductivity; diffusion. On the suggestion of Prof. Tait, Prof. W. Burnside applied a method used by the former in his first paper to the problem—Given a very great number of smooth elastic spheres, equal and like in all respects, whose centres of figure and centres of inertia do not coincide, and the sum of whose volumes is but a small fraction of the space in which they move, it is required to find the ultimate distribution of energy among the various degrees of freedom when by collisions the system has attained a "special state." Prof. Burnside's result is given in a paper "On the Partition of Energy between the Translatory and Rotational Motions of a Set of Non-Homogeneous Elastic Spheres." The various steps of the investigation are given in detail, and the assumptions are clearly specified. The conclusion is that the average energies of rotation of a sphere about each of the three principal axes are equal, and the whole average energy of rotation of a sphere is twice the average energy of translation.

Sir W. Thomson communicated sixteen papers to the Royal Society during the period under consideration. These include a remarkable series of investigations of various cases of fluid motion. Most of the papers have already appeared in the *Philosophical Magazine* or elsewhere; only four are given in detail in the Proceedings. These are "On a New Form of Portable Spring Balance for the Measurement of Terrestrial Gravity," "On the Front and Rear of a Free Procession of Waves in Deep Water," "On the Equilibrum of a Gas under its own Gravitation only," and "On Stability of Fluid Motion: Rectilinear Motion of Viscous Fluid between two Parallel Planes." From results obtained in the latter paper, Sir William considers it probable "that the steady motion is stable for any viscosity, however small; and that the practical unsteadiness pointed out by Stokes forty years ago, and so admirably investigated experimentally five or six years ago by Osborne Reynolds, is to be explained by limits of stability becoming narrower and narrower the smaller is the viscosity."

The following extract will give an idea of the scope of a paper by Lord Rayleigh, "On the Colours of Thin Plates":—"The theory set forth so completely in our treatises tells us indeed how the composition of the light reflected depends upon the thickness of the plate, but what will be its colour cannot, in most cases, be foretold without information of an entirely different kind, dealing with the chromatic relations of the spectral colours themselves. This part of the subject belongs to physiological optics, as depending upon the special properties of the eye. The first attempt to deal with it is due to Newton, who invented the chromatic diagram, but his representation of the spectrum is arbitrary, and but a rough approximation to the truth. It is to Maxwell that we owe the first systematic examination of the chromatic relations of the spectrum, and his results give the means of predicting the colour of any mixed light of known composition. Almost from the time of first reading Maxwell's splendid memoir, I have had the wish to undertake the task of calculation from his data the entire series of colours of thin plates, and of exhibiting them on Newton's diagram. The results are here presented, and it is hoped may interest many who feel the fascination of the subject, and will be pleased to see a more complete theory of this celebrated series of colours."

A little note by the (then) Astronomer-Royal for Scotland on Brewster's line Y in the infra-red of the solar spectrum is illustrated by an exceedingly instructive plate. The line Y is one of three discovered by Brewster in a portion of the spectrum usually invisible. As the Astronomer-Royal well remarks, "It was Brewster's eye that looked; so no wonder that he saw with it more than any of his predecessors, and most of his successors as well." Prof. Smyth proves that Y is a true solar line, being more distinct with a high than with a low sun. In the Royal (London) Society's publications the opposite had been asserted; and ultimately, though perhaps unintentionally, the line was altogether omitted from the spectrum—or, rather, it was misnamed Z. It is to be hoped that Prof. Smyth's paper will have the effect of removing all the ambiguity, and the consequent confusion, on this point. In this note, short as it is, we have evidence of the unlooked-for rewards which often await the scientific observer. While seeking for direct confirmation of M. Henri Becquerel's discovery that the line Y is due to sodium, Prof. Smyth discovered three new air-lines much farther in the infra-red than any previously discovered.

Prof. Piazzi-Smyth has also a paper on "Micrometrical Measures of Gaseous Spectra under High Dispersion." The paper is accompanied by maps of the spectra investigated on the scale of 40 feet to the visible spectrum. The prism arrangement gave a dispersion of 60° from A to H, and the magnifying powers of the telescope varied from 12 to 36 with a further magnifying power of 5 in the recording apparatus. There was thus in effect a possible dispersion of 9000°. The gases dealt with are CH, CO, H, O, and N. The peculiar arrangement of the leading lines (usually two) and train of linelets in each of the five bands of the CH spectrum is fully shown in the diagram and described in the text. The low-temperature (simple spark) spectrum of hydrogen is given, over 1600 lines being recorded. Prof. Smyth has found that three of the four principal oxygen lines are triple, and he has discovered three other such triplets. The remarkably methodical spacing of the lines in these triplets and of the triplets themselves is noted; but a more striking example of regular spacing is furnished by the lines in the green CO band. The map of this band is given on the scale of 120 feet to the visible spectrum. Prof. A. S. Herschel has made out two series of lines (single and double respectively) following the same law of arithmetical progression. The full interpretation of such "natural writing" may possibly never be obtained until we know the nature of molecules and atoms; but, on the other hand, a further investigation of spectra such as we have here may throw some light on molecular and atomic structure. So magnificent are the maps that accompany Prof. Smyth's paper, that one is rather inclined to speak of his contribution to the Transactions as a series of maps of spectra with explanatory text. But besides explanations the paper contains a full record of the experiments, and also tells a tale of high war—the combatants being the author on the one hand, and the London Royal Society, the London Royal Astronomical Society, *et hoc genus omne*, on the other. Vacuum-tubes containing nominally CO, but also showing exceptionally strong CH bands, were "by a London maker." Prof. Smyth once admitted (though with great reserve), with "the English spectroscopists," that the CO spectrum might be that of pure carbon; he "begs now to apologize for that error;" and, long after he has come off victorious throughout the whole line, the rumble of distant thunder is heard in his "concluding notes."

Mr. John Aitken's investigations regarding the formation of small clear spaces in dusty air are already known to the scientific public, from the abstract published in NATURE, vol. xxix. p. 322 (January 1884). His paper on dew, a short abstract of which appeared in NATURE, vol. xxxiii. p. 256 (January 1886), is also contained in the Transactions. Some observations in addition to those indicated in NATURE are described. These refer to evaporation from extremely dry soils in Britain and France, and also, on the evidence of travellers, in Australia and South Africa. Additional evidence regarding the formation of the dewdrop is also given.

Mr. A. Crichton Mitchell has repeated Forbes's and Tait's experiments on the thermal conductivity of iron, copper, and German silver. His observations were conducted under improved experimental conditions, and the methods of calculation were different in some respects. These differences are pointed out and explained by Prof. Tait in an introduction to Mr. Mitchell's paper. On the whole, Mr. Mitchell's work confirms that of previous experimenters. One of the most important of his conclusions is that iron forms no exception to the rule that the thermal conductivity of ordinary metals increases with rise of temperature.

Prof. C. G. Knott, of Tokio University, Japan, gives a full experimental investigation of the thermo-electric peculiarities and the electrical resistance of hydrogenized palladium. In another paper he treats of the electrical resistance of nickel at high temperatures, and concludes from his results that "there is a strong presumption that the Thomson effect in metals has a close connection with the mutual relations of resistance and temperature."

From a series of observations made in atmospheric electricity at the top of Dodabetta, the highest hill in the Neilgherries, Prof. C. Michie Smith is led to the conclusion that on the edge of a dissolving mist the potential is lower than the normal, while in a condensing mist it is higher than the normal. He says: "If my results are confirmed by more extended observations, strong support will be given to the theory which looks on the condensation of a number of slightly charged particles into larger drops as the cause of the high potential indicated by disruptive discharges." In connection with this, results obtained by Mr. H. N. Dickson regarding the direction of earth-currents at Ben Nevis are worthy of note. When mist descends on the mountain, or rain (or snow) falls, a down current is observed in the telegraph cable when put to earth at both ends; but when the mist rises from the mountain-top the direction of the earth-current is upwards.

Von Helmholtz contributes an account of galvanic currents passing through a very thin stratum of an electrolyte.

Many of the facts brought out in a series of papers by Dr. H. R. Mill and others on various physical and chemical conditions of tidal estuaries should be of much use because of their evident bearing on the distribution of various forms of animal life, and on questions connected with meteorology.

A number of years ago Prof. Tait undertook the work of determining the pressure-errors of the *Challenger* thermometers. This investigtion gave rise to many others: such as the lowering of the maximum density-point of water by pressure; the variation of the compressibility of water with temperature, pressure, and amount of salt dissolved; and the question of the internal pressure in water. The various results obtained by Prof. Tait are contained in a series of notes scattered throughout the Proceedings.

The complete series of observations made at the Ben Nevis Observatory have been handed over to the Royal Society of Edinburgh for publication; and, from time to time, valuable meteorological information in connection with the Observatory is communicated to the Society and appears in their Proceedings. Dr. Murray remarks that "the refusal of assistance (to the Observatory) by the London Committees may be partly due to the fact that there are many claims on the funds which they administer, but it appears also to be very largely due to a want of proper knowledge of what has been done, and what may be reasonably expected to be done, by the Observatory, there being no Observatory in these islands that can compete with the Ben Nevis Observatory for the accuracy and intrinsic value of the hourly observations; and absolutely no pair of stations anywhere in the world that can be named alongside the Observatory and the station at Fort William as contributing data in furtherance of our knowledge of storms and the science of weather generally."

These volumes contain two or three papers in the department of engineering. Mr. A. C. Elliot gives a new formula for the pressure of earth against a retaining wall, which is an improvement on Rankine's formula. In a paper on "Cases of Instability in Open Structures," Dr. E. Sang discusses a class of theorems of which one previously enunciated by him—to the effect that any symmetric structure built on a rectangular basis, having no redundant parts, and depending on longitudinal strain alone, is necessarily unstable—was a particular example.

In the department of chemistry we note an elaborate paper by Prof. Dittmar and Mr. John McArthur, entitled "Critical Experiments on the Chloro-platinate Method for the Determination of Potassium, Rubidium, and Ammonium; and a Redetermination of the Atomic Weight of Platinum." The paper consists of five parts—two detailing experiments on the composition of chloro-platinate of potassium, a part on Finkener's and Tatlock's methods of potash determination, a part descriptive of experiments on chloro-platinate of rubidium, and another describing experiments on chloro-platinate of ammonium. The authors conclude that the atomic weight of platinum is very nearly 195·5.

Prof. Dittmar also gives, in conjuction with Mr. C. A. Fawsitt, a "Contribution to our Knowledge of the Physical Properties of Methyl-alcohol." The "vapour-tension" (why not *pressure* since it *is* pressure?) is investigated under varying conditions, and the specific gravity of aqueous methyl alcohol for all the integral percentages is also tabulated at 0° C. and 15°·56 C.

Dr. John Waddell has determined the atomic weight of tungsten by an entirely new method, and has obtained results confirmatory of the commonly accepted value.

Comparatively few papers dealing with botanical questions were communicated to the Society during the period under consideration. A note "On the Structure of the Pitcher in the Seedling of *Nepenthes*, as compared with that in the Adult Plant," in which the late Prof. Alexander Dickson first called attention to the peculiar large marginal glands of *Nepenthes*, is of much interest. The Proceedings contain the fourth part of "Diagnoses Plantarum Novarum Phanerogamarum Socotrensium, &c.," by Prof. Bayley Balfour, and a note "On Degenerated Specimens of *Tulipa sylvestris*, by Mrs. A. B. Griffiths. Mr. John Rattray contributes a note on the marine plant *Ectocarpus*.

The number of papers in zoology and allied sciences is somewhat large.

In the summer of 1868, H.M.S. *Lightning* explored the region of the North Atlantic lying between the Hebrides and the Faroes. In 1869 H.M.S. *Porcupine* made three cruises, the first off the north-west and the west coasts of Ireland, the second off the south and south-west coasts of Ireland, and the third off the north of Scotland as far as the Faroes. In 1870, the *Porcupine* dredged down the west coasts of France and Spain and in the neighbourhood of Gibraltar Strait, and explored the African coast of the Mediterranean as far east as Sicily. Prof. W. A. Herdman contributes to the Transactions the Report upon the *Tunicata* dredged during the cruises of H.M.SS. *Porcupine* and *Lightning* in the summers of 1868, 1869, and 1870. The Simple Ascidians alone are treated of. The Report on the *Pennatulidæ* dredged by the *Porcupine*, is by Prof. Milnes Marshall and Dr. G. H. Fowler. One new genus and one new variety were obtained. Dr. P. H. Carpenter writes "On the *Crinoidea* of the North Atlantic between Gibraltar and the Faroe Islands," and some notes are added by Prof. L. von Graff on the *Myzostomida*. The Report on the *Ophiuroidea* of the Faroe Channel, mainly collected by H.M.S. *Triton* in 1882, is drawn up by Mr. W. E. Hoyle. Mr. Hoyle also gives the second part (on the *Decapoda*) of a preliminary Report on the Cephalopoda collected by H.M.S. *Challenger*.

Mr. J. T. Cunningham (then of the Scottish Marine Station) writes on the "Eggs and Larvæ of Teleosteans;" on the "Reproductive Organs of *Bdellostoma*, and a Teleostean Ovum from the West Coast of Africa;" on *Stichocotyle nephropis*, a new Trematode, found as a parasite in the Norway lobster; and, along with Mr. Rupert Vallentin, on the "Luminous Organs of *Nyctiphanes norvegica*." Mr. George Brook discusses "The Formation of the Germinal Layers in Teleostei." Mr. Harvey Gibson gives a detailed account of the anatomy of *Patella vulgata*, no systematic account having been previously given, though separate accounts of various organs have appeared. Mr. Frank E. Beddard writes "On the Minute Structure of the Eye in certain *Cymothoidæ*;" "On the Structural Characters of certain new or little known Earthworms," five apparently new species and possibly a new genus being described; and "On the Reproductive Organs of the Genus *Eudrilus*." Mr. J. Arthur Thomson describes the structure of *Suberites domuncula*, a sponge found covering the outside of a sea-snail shell inhabited by a hermit-crab.

In geology some important papers appear. Dr. Traquair contributes the first part of a Report on fossil fishes collected in Eskdale and Liddesdale (*Ganoidei*). Mr. R. Kidston gives the first two parts of an account of the fossil flora of the Radstock series of the Somerset and Bristol coal-field (Upper Coal Measures). A note is appended on the fossil flora of the Farrington, New Rock, and Vobster series, and a table is given comparing the flora of the Radstock series with that of other coal-fields. Mr. Kidston also discusses the fructification of some ferns from the Carboniferous formation. Prof. Geikie writes on the geology and petrology of St. Abb's Head. The final Report of the Boulder Committee of the Society is contained in the Proceedings.

The plates in Vol. xxx. accompanying a paper by Dr. Traquair on fossil fishes are of great artistic merit. Indeed, the illustrations which are contained in the Proceedings and Transactions are probably unsurpassed by those published by any other similar Society.

Observations by Dr. H. B. Guppy, of H.M.S. *Lark*, on coral reefs and calcareous formations of the Solomon Group, appear in both publications. He is led to the conclusions: (1) that these upraised reef-masses, whether atoll, barrier-reef, or fringing-reef, were formed in a region of elevation; (2) that such upraised reefs are of moderate thickness, their virtual measurement not exceeding the limit of the depth of the reef-coral zone; (3) that these upraised reef-masses in the majority of islands rest on a partially consolidated deposit which possesses characters of the "volcanic muds" which were found during the *Challenger* expedition, to be at present forming around volcanic islands; (4) that this deposit envelops anciently submerged volcanic peaks. The bearing of the two latter conclusions on Dr. Murray's theory of the formation of coral islands is important.

We conclude with another quotation from the address already referred to:—"With respect to Scotland, the only grant for scientific purposes in aid of learned Societies is £300 annually to the Royal Society of Edinburgh, which is repaid to a department of the Government in the form of rent. One might well ask what Scotland had done that her learned Societies and scientific men should be treated so niggardly as compared with those in England and Ireland. It cannot be because she does no scientific work. It is sometimes said, indeed, that in literary matters Scotland, and especially Edinburgh, is a mere shadow of her former self; but in science this is not the case, and it is towards scientific matters that the great ploughshare of human thought and activity is, in this age, directed. I question if any country in the world, taking into consideration its size, can show a better record of scientific work, or a more excellent volume of scientific literature than Scotland, during the past ten or twenty years."

TIME.

TIME is one of the very numerous subjects which seem to be perfectly simple until we begin to think about them; then difficulties crop up in all directions, and afford a favourite battle-ground to philosophers.

Newton, avoiding metaphysical difficulties, gave an account of time which suffices for all the purposes of the mathematician and experimentalist. "Absolute, true, and mathematical time of itself and from its own nature flows equably and without regard to anything external, and, by another name, is called duration; relative, apparent, and common time is some sensible and external measure of duration by means of motion."

The word time is here used to express two distinct ideas, for the former of which it would be better to reserve the term duration. This double meaning of the word has caused much controversy between idealists and materialists, which is still far from arriving at any definite result. Thus, Whewell writes ("Hist. Ind. Sci.," 131):—"Time is not a notion obtained by experience." "Time is a necessary condition in the presentation of all occurrences to our minds. We cannot conceive this condition to be taken away. We can conceive time to go on while nothing happens in it, but we cannot conceive anything to happen while time does not go on."

It has always seemed to me that philosophers are rather hard on the intellect of their fellow-mortals in laying down so absolutely, as they are fond of doing, what can and what cannot be conceived by the mind, when they are in reality arguing from a single instance—their own. Many persons would be tempted to say that the idea of the fourth dimension of space is inconceivable, did not men of more powerful intellect assure them that their crude ideas on the subject are quite erroneous. I can myself find no impossibility in the conception of a universe composed of a homogeneous mixture of gases, to which the ordinary conception of time does not apply. If I err, I at least do so in good company. Lucretius writes (i. 460):—

> "Tempus item per se non est, sed rebus ab ipsis
> Consequitur sensus."

And, in 1690, Locke gave the following luminous exposition of this difficult matter ("Hum. Und.," xiv.):—"A man having, from reflection on the succession and number of his own thoughts, got the notion or idea of duration, he can apply that notion to things which exist while